



**AQUAPONICS AND ORGANIC AGRICULTURE**  
*- Can the two go together?*

## AQUAPONICS - DEFINITION

- The combination of aquaculture and hydroponics, where nutrient rich water from the aquaculture component is used as fertilizer for plants grown in various hydroponic systems.
- Closed circulation system where the plants purify the water which is then pumped back into the aquaculture tanks.
- This forms a closed symbiotic eco-system of fish, plants and beneficial organisms.
- Water conserving, using only 2% of the water needed by a conventional irrigated farm for the same vegetable production. *(source: Wikipedia)*



# AQUAPONICS – MAIN SYSTEM TYPES

There are three types of hydroponic systems predominant in aquaponic cultivation:

## ○ Media filled beds

- Plants grow in containers filled with rock medium of some kind.
- Water from fish tank is pumped over bed. Two styles, continuous flow or ebb and flow cycle (flood/drain).
- Media used is usually gravel or expanded clay pebbles or a combination of both.
- Suitable for growing bigger plants with larger root systems than the other two types.

## ○ Nutrient Film Technique (NFT)

- Plants sit in small plastic cups in narrow enclosed gutters.
- Water flows down gutter in a very thin film
- Only suitable for leafy green vegetables with small root systems.



# AQUAPONICS – MAIN SYSTEM TYPES

## ○ Deep Water Culture (DWC)

- Plants floated on top of the water.
- Works best if water is pumped through a filtration system first.
- Most common model uses long channels where rafts filled with plants float on the water surface and extract nutrients from the filtered water.
- Suitable for plants with small root systems.

Many aquaponic systems combine media filled beds and deep water culture where the media filled beds act as a biofilter filtering the water before it enters the DWC channels.



## THE REGULATORY FRAMEWORK - HYDROPONICS

The problem with all these systems is that they are „soil-less“ systems, which are currently not permitted in organic farming according to the EU regulation 889/2008. As clearly stated in article 4 of the regulation:

***„Hydroponic production is prohibited.“***

The USDA organic standard however, does not specifically prohibit hydroponic production and there are some aquaponic farms in the US certified to the NOP standard. The certification does however only apply to the plants and produce since the standard does not allow for certification of fish.

Neither standard specifically addresses aquaponic production systems.



## THE REGULATORY FRAMEWORK - AQUACULTURE

The EU regulation has a recently added chapter on organic aquaculture. However, article 25g of 889/2008 states that for organic aquaculture units on land:

**„Closed recirculation aquaculture animal production facilities are prohibited.“**

Therefore, with the current state of the EU regulatory framework, aquaponic systems, as they are traditionally set up, can not be certified as organic.



## COMMON GROUND

Apart from the lack of soil and the closed recirculation of water, the principles of aquaponics are in compliance with some of the main principles of organic farming, such as:

- Production based on ***appropriate design and management of biological processes based on ecological systems using natural resources which are internal to the system***
- ***minimisation of the use of non-renewable resources and off-farm inputs***
- the ***recycling of wastes and byproducts of plant and animal origin*** as input in plant and livestock production.

*(Articles 4 and 5 of EU regulation 834/2007)*



# WHAT CAN BE CERTIFIED AS ORGANIC?

For certification of **plant production**, the system must be:

- a **soil-based system** that adheres to the organic principles of maintaining and enhancing soil life, natural soil fertility, soil stability and soil biodiversity. *(Article 5 EU regulation 834/2007)*

For certification of **fish production**, the system must be:

- a **flow-through system** that otherwise fulfills the species specific requirements for organic aquaculture.





## HYPOTHETICAL ORGANIC AQUAPONIC MODEL

- Combined this could mean some sort of flow-through aquaculture system where the filtered effluent would be used to irrigate a soil-based plant production system.
  - One possibility could be some sort of media filled beds with a gravel base where the effluent flows through, topped by a soil layer where the plants grow.
- Some of the economic advantages of aquaponics are inevitably lost in this model:
  - water conservation
  - faster growth rate of plants growing in hydroponic systems vs. soil-based systems.



# THE REQUIREMENTS FOR CERTIFICATION OF ORGANIC PLANT PRODUCTION:

- Plants must be grown in a soil-based medium
- No prohibited substances can be used in the plant production or aquaculture components.
- The effluent from the aquaculture tank cannot come in direct contact with plants produced for food consumption
- Added trace nutrients must be allowed according to the standard
- Total N-consumption must be within the limits of the standard
- Ideally the fish-feed should be organic or as a minimum, must be of non-GMO origin



# THE REQUIREMENTS FOR CERTIFICATION OF ORGANIC AQUACULTURE PRODUCTION:

Rearing units must comply with the requirements of the EU regulation for aquaculture which are too vast to go into detail here.

A few main points to consider:

- Species specific requirements for production systems
  - For ex.: Tilapia (commonly grown in aquaponics) must be raised in ponds or net cages
- Species specific requirements for stocking density and feed
- Only natural borehole water is allowed to heat or cool water
- Restricted use of anti-biotics and other medications
- Restrictions on the use of artificial light.
  - Indoor units must have windows to allow access of natural light



# PETITION FOR REVISION OF THE EU REGULATION FOR ORGANIC PRODUCTION

There is currently an on-line petition open for signatures, urging the EU to allow organic certification of modern farming techniques. The petition can be signed here:

[https://secure.avaaz.org/en/petition/allow Organic Certification for more modern techniques/?pv=3](https://secure.avaaz.org/en/petition/allow_Organic_Certification_for_more_modern_techniques/?pv=3)

- The petition suggests a clearer definition of the word “soil”, allowing for a wider range of materials of natural origin to be certified as “organic soil”.

- The suggested definition is:

"All mixtures consisting of materials of only natural origin (sand, dust, stone, rock, clay, chalk, etc...) and their man made derivatives (i.e. perlite , vermiculite, etc ...), fertilised by nutrients of only natural origin (i.e. manure, decaying plants, compost, etc ...), so that they develop a healthy natural environment for bacteria, insects and invertebrates, of which the composition is recorded, can be certified as Organic Soil."

